

THE MODEL **HEALTH** **SHOW**

EPISODE 542

The Hidden Connection Between Calories And Flavor & The End Of Craving

With Guest Mark Schatzker

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SHAWN STEVENSON: Welcome to The Model Health Show. This is fitness and nutrition expert, Shawn Stevenson, and I'm so grateful for you tuning in with me today. The debate has been raging on for years now, are we eating too many carbs? Are we eating too much fat? Are we eating too many calories? We're all trying to get to the heart of the matter. What has happened in our society? What has led us to the place where, as of this recording, according to the World Health Organization, about 11 million people die every year from diet-related conditions? Here in the United States, we're knocking on the door right now, "Hello," we're knocking on the door, about 250 million of our citizens are now overweight or obese. It is beyond an epidemic, and this is one of those things, and again, it's much debated, but the reality is, what we've done thus far has not been working. And answering the question of, is it an over-consumption of calories, is it an overconsumption of carbohydrates, is it the fat? All of these things have been swirling around, and today, we're going to answer these questions. And I'm just going to give you a heads-up, this revelation is that it can quite possibly be none of these things, and it's likely something much deeper, something much more intimate, that is causing these metabolic derangements.

And the great news is that though the situation might look a bit bleak right now, there is light at the end of the tunnel, there is something that we can do about this, because when we're in a state like we are now, where again, we're knocking on the door of about 250 million of our citizens are overweight or obese, 130 million US citizens having diabetes or pre-diabetes, we are leading the charge in the world in these categories. We are the sickest, most chronically diseased nation in the world right now, and this is just for starters, with obesity and diabetes, not to mention heart disease, our number one killer, but we can also lead the charge towards healing. We can also lead the charge toward solutions. And also, really our world family is getting in on this when we start to look at things through the right lens. Again, so we're a good social experiment here in the United States because we're not doing well, and I believe that we can right the ship, but it starts with education, it starts with being able to... Sometimes the most difficult things to understand are the obvious.

Sometimes the most challenging things for us to analyze and for us to discuss, are the things that we consider to already be true. So today, we're going to dive into a domain and start to look at things through an entirely different lens, something where we're going to take a step-by-step approach with one of the most brilliant thinkers that I've seen to date in this domain of health, of nutrition, and understanding what is the underlying mechanism and have we been missing the mark all this time, and with that said, what can we do as far as our focus to start to turn this thing around for the better. So, it's going to be incredibly enlightening and paradigm-shifting. So really, really excited for you to go on this journey with me. Now, one

thing that we do know for certain is that our macronutrients do matter, absolutely. And part of this is digging deeper into those categories and understanding that all carbs are not created equal, all fats are not the same. The same with protein, there's a spectrum of validity within, and there's a spectrum of value, there's a spectrum of benefit and potential harm.

And so, when we understand this, and we look at, Okay, our bodies are fueled, it is a primary fuel, but also if we're talking about structural integrity of the human body, of the brain, the human brain, if we're talking about the dry weight of the human brain is mostly fat, this matters, we have to give our body the primary building blocks for all of these structures that are dependent upon fat. Our cells could not maintain structure without fat, it's literally what's helping to contain the cell membrane. It's, in many ways, sort of like a version of a brain of the cell itself. In school, of course, we're inundated with this belief that it's the nucleus, it's the brain of the cell, but I'll give you a little bit of a heads-up here. You can remove the nucleus from the cell, and it can still live, it can still do stuff, it can reproduce, it can eliminate waste, it could assimilate things. Now, it might die a little sooner, a little sooner, but it could still last. But if I take your brain out, it's over, that's it, lights out. Alright, so just to say, "Hey, this is the brain of the cell, end of story."

There's also a remarkable intelligence with that cell membrane and the cell signaling, and being able to respond to the environment, there is a hyper-intelligence there, and it's largely governed by fat, and the quality of fats we provide for ourselves is of the utmost importance. A randomized double-blind study, published in the International Journal of Obesity and Related Metabolic Disorders, placed participants on a reduced-calorie diet that included either supplemental medium-chain triglyceride or MCT's, or supplemental long-chain triglycerides or LCT's. They just gave them two different types of fat to see what would happen. Same reduced-calorie diet. Now, here's what happened. After the data was compiled, they revealed that the group who included the MCTs in their diet lost more weight, eliminated more body fat, and experienced higher levels of satiety.

MCTs have a remarkable resonance with human metabolism, something interesting really takes place, and even if we're talking about the satiety factor, plays a lot in the bigger picture that we're going to be talking about today. But I'm a major fan of MCTs, and this is something that I include literally on a daily basis. I have some MCT oil, but the quality, like everything else, matters most. So, we're not just running out and getting MCTs from company X, because you hear that, "Hey, MCTs are great." We want to make sure that folks are getting things that are sourced from a place that is doing things with efficacy, that actually cares about the product that they are delivering for you.

I get my MCT oil from Onnit, go to onnit.com/model. That's O-N-N-I-T.com/model. You're going to get 10% off their properly sourced MCT oil, coconut-derived, there's no other binders, fillers,

there's no other things it's getting cut with. That's happening out there on the streets as well, these lower-level dealers that cut and stuff. You're getting that 100% primo MCT oil, alright? Again, this is something I have on a daily basis. And also, I know you can't see me right now if you're listening to the audio version of this episode, but I've got on an Onnit hoodie right now, and I'll just tell you when you step on the scene with Onnit gear, people notice. Alright? It's some of my favorite gear to wear. I work out, my Onnit tees, got my Onnit hoodie. They've got amazing apparel as well. Incredible style and this is geared towards fitness and performance as well, just so many great things. And guess what? You get 10% off that as well, so head over there, check them out, onnit.com/model. And now, let's get to the Apple Podcast review of the week.

ITUNES REVIEW: Another five-star review titled "Best health show out there" by Ed Chase. "Great show, the information I have learned from Shawn has been so empowering, so grateful for this show and his books, great content, and he's very meticulous regarding the information he shares, always giving us the unbiased truth."

SHAWN STEVENSON: Let's go. That's what it's all about, thank you so much for leaving me that review over on Apple Podcast, and if you're yet to do so, please pop over to Apple Podcast and leave a review for The Model Health Show. And on that note, let's get to our special guest and topic of the day. Our guest today is Mark Schatzker, he's the author of the brand-new book, *The End of Craving*, and also, he's the author of the smash-hit book, *The Dorito Effect*. He is a writer and a residence at the Modern Diet and Physiology Research Center, which is affiliated with Yale University. And his writing has appeared in *The New York Times*, *The Wall Street Journal*, and *The Annual Review of Psychology*, and he's back for his second appearance here on The Model Health Show, to drop some powerful insights. Let's jump into this conversation with the amazing Mark Schatzker. Incredible to have you back on the show. How are you?

MARK SCHATZKER: I'm great. Very happy to be back.

SHAWN STEVENSON: Such an honor. Your first book blew my mind, I think it blew the world's mind. *The Dorito Effect*. But you've got a new book out. And if I could tell you this, I've got it right here in my hand, this book is so phenomenal, you're such a great writer, and I think you know this already, but I'm just going to give you a confirmation here, but you're such an incredible writer and storyteller, and so it's just like, it's so interesting, just to read along with you as you're telling these stories. So, man, hats off to you. *The End of Craving* is out right now. Everybody, make sure you go get a copy.

MARK SCHATZKER: Well, you're incredibly kind. Thank you so much for the nice words.

SHAWN STEVENSON: Of course, so the first thing I want to ask you about is, the debate of the day is the carbs versus fat debate.

MARK SCHATZKER: Yes.

SHAWN STEVENSON: But this debate has actually been going on for decades now, and you highlight that.

MARK SCHATZKER: It really has. Yeah, it has. It's funny when you think about how long it's been, it's like 20 years that we kind of... The carb thing has been happening, it's been kind of developing, but it's like a good two decades old now, which it doesn't feel that old, kind of like me, I don't feel that old, but I am.

SHAWN STEVENSON: That's right. And you also talk about Atkins coming forward, and him sharing his data...

MARK SCHATZKER: Yeah.

SHAWN STEVENSON: But actually, having folks to put these things to the test and some of the studies you actually talk about, with low carbers going up against folks doing a low-fat protocol. And can you talk about some of the results that are actually seen when these things are put to the test long-term?

MARK SCHATZKER: Yeah, so this kind of popped into popularity about 20 years ago, there was a famous essay in The New York Times magazine, What If It's All Been a Big Fat Lie, by Gary Taubes, and that's when the kind of the low carb movement started to gain respectability, a lot of scientists got on board. Well, since then, it's been two decades, there's been a lot of scientists putting it to the test, and what we see is that in trials, when scientists test this, it doesn't work out. So, I talk about two studies in the book, one was by Kevin Hall.

He put subjects in a metabolic ward, which it's kind of like a hospital hotel where he can teach subjects and he can feed them a diet that is absolutely pinpoint on whether it's high fat or high carbohydrate, and then he can measure every aspect of how their body functions, to see if we see what the carbohydrate-insulin model predicts, which is to say, this metabolic defect that consuming carbohydrates causes a change in metabolism and causes the accumulation of fat. And what we see is that that just doesn't happen. What he found, to his surprise... 'cause it's interesting when you consider, there's two kinds of macro-nutrient fuels that the body runs on: Carbs and fat, and they're quite different. Fat is gooey, blubbery, and carbs are starchy or sweet. And what was so interesting about this study is that the human body could use them almost exactly... With the exact same rate of efficiency.

If anyone had the advantage, it went to carbs, in fact, that people seem to not gain weight or lose weight a little bit more easily, but it was such a fine difference as to be academic. What was so startling about that study was how similar they were. Well, then there was another study done at Stanford by Christopher Gardner, a very well-respected scientist. And this wasn't done in a lab, it was done with hundreds of subjects, free, living people, half of whom were on a healthy high-carb diet and half of whom were on a healthy ketogenic or high-fat diet. And we saw the same thing happen, which is to say, if people stuck with the diet, they tended to lose weight, and it was in equal measure, which is to say, if people followed both diets, both were effective. But not everybody managed to do that, some people, in fact, gained a tremendous amount of weight. And all these ratios were equal, such that if you looked at kind of a bar chart of each diet and how the various people performed, they looked identical.

So, what the science is telling us is that we've been casting about, thinking that the villain, that the agent that is causing us to gain weight is the fuel, that we've been consuming the wrong fuel. In the 1970s and '80s, we thought fat was the wrong fuel, and then we switched, and we said carb is the wrong fuel. And what we're finding is that that's just not the case. People with obesity tend to consume both of these fuels in too large of an amount.

SHAWN STEVENSON: This is a powerful statement, because, of course, this debate is raging on, when in reality, if we look at the data, what we see is that, again, as you mentioned, both diets tend to be effective, which folks who become very religious about their diet tenet, because it

might have worked for them, believe that this is the solution for everybody, when in fact, it's a diversity.

MARK SCHATZKER: That's right.

SHAWN STEVENSON: And one of the things that is so interesting, again, we can look at some of the underlying mechanisms here with insulin, with leptin and all these different things, but at the end of the day, are folks losing weight and can they sustain it? And you just mentioned another thing. So, we're trying to target and demonize the macronutrients to try to figure out how do we crack this code of rampant obesity in our culture? But also, one of the other things we target is calories. And in the book, you talk about a study from Yale University that set out to find if posting calorie information next to restaurant menu items could help people to eat more sensibly. Talk about that.

MARK SCHATZKER: Yeah, this is... Well, because we all feel that consuming excess calories causes weight gain. And I think that is true. And we also think, well, then we just need to control that. So, if we post the numbers next to menu items, "This has 200 calories, this has 500 calories," maybe this will help us make better choices. But what we find in studies... When people have access to that information, does it change their choices? Yes, it does. But in the short term. So, people, when they see that information, they might decide to have maybe just one slice of pizza instead of two, or maybe to have a salad. But what we find is that later on, they will have a larger dinner, they might snack in front of the television, and unconsciously, they will gain that back. And what this is telling us is very important, is that so much of how we've regarded diet and weight gain has been based on a myth, which is that we have conscious control over what we eat and how much we eat. And so much of this is, in fact, controlled by a deeper part of the brain that we don't really have access to. It's kind of like your heart rate or the rate at which you breathe or how you unconsciously blink. These aren't things that you can make a decision about. They happen often despite your strongest efforts to change them.

SHAWN STEVENSON: Another thing that I love... You start the book off by basically pointing out these fallacies that we tend to have. And you highlight this incredible city in Italy that is

well-noted for its plethora of delicious food. Because another argument is, well, it's because of the amount of food we're consuming here in the United States versus there, and eating, "bad foods," what we would consider on the surface to be bad foods. Can you talk about this city and that connection?

MARK SCHATZKER: Well, and even more, I think we're afraid. We've been guarded against the pleasures of eating. There's that famous saying, if it tastes good, spit it out. That we think the pleasure of eating is going to take us to a bad place, that we're somehow inclined towards over-eating. So, then I visited a city called Bologna. This is in Northern Italy. They do not eat a Mediterranean diet in Northern Italy. You're familiar with the lunch and meat bologna, sometimes called bologna, it comes from Bologna. There, they call it mortadella. It's a deli meat that they take enormous pride in. They have rules about how it's made. And you can see that it's flecked with cubes of white fat. They are not afraid of fat at all in Bologna. They have another... I wouldn't even call it a meat, a... It's called lardo. It's very thinly sliced pig fat, and they drape it over crusty bread. This is carbs and fat in its purity, and they revere it as a wonderful delicacy. They revere pasta.

In the Chamber of Commerce, they have a golden noodle. Their favorite noodle's called tagliatelle. It's kind of wider than spaghetti, it's made with eggs. Once again, a blending of these two nutritional villains, carbs, and fat. They have the platonic, perfect, golden noodle, the scientific achievement that all noodles should aspire to be. They have a repository of recipes in Bologna, which is to say, rules as to say, these recipes, and we're talking about things like lasagna, or their famous meat sauce, must be made a certain way. The food in Bologna is incomparable. It is one of the world's great dining destinations. Millions of people from all over the world fly to Northern Italy, just so they can eat what the locals are eating. So, if it were true that eating this delicious food is going to make us gain weight, you would expect these Northern Italians would be the plumpest in the world. And their rate of obesity is astonishing, it's less than 8%. Here in the United States, it's 42%. Just try and reckon that. 8% versus 42%.

SHAWN STEVENSON: This is nuts... To put it lightly. And just looking at... Here we have a population of folks who are consuming, as you mentioned, with... Throughout the book, delicacies in terms of pastries and pastas. And bologna... But again, this is just a little

foreshadowing, the baloney that I was eating from my corner store was not the same baloney that these folks are eating.

MARK SCHATZKER: It's not the same. No. And that's an important difference.

SHAWN STEVENSON: And so, I would go there, we'd get it sliced... My mom would have us go get that... The baloney sliced up. And oftentimes, of course, we would fry it. And we'd do our hood sandwich, basically. But it has a root... And also, even the most popular really pasta dish, coming from this particular place. But what people tend to think of when they think of Italy... We think of these various blue zones, we think they're just eating fish and vegetables and olive oil, and that's the end of story. But it is so much more colorful and so much more variety than that.

MARK SCHATZKER: Yes. And in fact, that classic Mediterranean diet, you tend to find further south in Italy. And oddly enough, there's actually more obesity in Southern Italy. Now, I'm not going to say that's due to the Mediterranean diet, but it's just to say, this is really so much more complex and fascinating, and I also think exciting. I mean, think about it, there's this population in Italy that's eating this wonderful, rich food and their trim. I mean, this gives us hope.

SHAWN STEVENSON: Right. And that's what it's really all about. And so, building upon this, you also talk about this really strange epidemic, that gripped Europe and also it made its way here to the United States. Let's talk about that.

MARK SCHATZKER: Yeah, because I want us to think, well, what's different about them? And I start to look at the history. And the truth is that Northern Italy was at one time, quite similar. This is going back a little over 100 years ago. They had an epidemic, a pandemic, and they didn't know the cause. It was called pellagra, which in an Italian dialect, literally means rough skin. And that's how it would start. It would start with a skin scale... A farmer, or a farmer's wife. And it might come back the next year, and it'll start to spread. And eventually, they would be covered in these hideous skin scales. They would lose their appetite, they would get horrible diarrhea, they would get dementia, they would behave in odd ways, they might attack children, and eventually they would die. And this is was...

SHAWN STEVENSON: You mentioned also... I got to point this out, you mentioned one guy cut his penis off and threw it out a window.

MARK SCHATZKER: Yes. Yes, I did. Yes, exactly. One guy...

SHAWN STEVENSON: My team is looking at me like, "Where did that come from?"

MARK SCHATZKER: Yeah, no, and it happened. He did do that. Which is a testament to what a powerful grip this disease had over people's minds. It literally changed the way they thought. Well, in... Just shortly after the turn of the last century, pellagra suddenly appears in Georgia. And again, it's a pandemic. It spreads throughout the South. And just like our modern pandemic of obesity, nobody knew the cause. There was all sorts of experts that claimed they knew the cause. They would pound their fists on the table. Some said it was caused by mosquitoes. Some said it was caused by germs, some thought it was a parasite, some thought it had to do with, whether you lived close to a river or not. They really had no idea.

And pellagra actually played a major role in our understanding of nutrition. It was eventually deduced by an epidemiologist named Joseph Goldberger, that it wasn't a disease, not an infectious disease, it was a nutritional disease. Because he cured people by getting them to eat different food. He would go to a sanitarium, for example, and he would make people eat... Have people eat milk or meat, cheese, beans, and the pellagra would disappear. And what we learned from that was that the conception of food changed. Food wasn't just food. They understood that there was elements within food that were necessary for the continuation of life.

And we eventually identified what the missing element in the diet of people with pellagra was. And it's what we call Niacin or vitamin B3. And this was a game-changer. This led to the eradication of pellagra. But what is so different is how these two cultures dealt with it, because I think that is what would define the present moment, we're in.

SHAWN STEVENSON: And so, how did we deal with it? Let's talk about enrichment.

MARK SCHATZKER: Yeah. Well, we did what you'd think you should do. If we're not getting a vitamin... If there's people out there literally starving to death because they're not getting this essential nutrient, let's just put this nutrient in the food system, it makes so much sense. And that's exactly what we did. In the early 1940s, the American government passed a law encouraging... Essentially making law what they call enrichment, also called fortification. We began to add B vitamins, Niacin, Thymine, Riboflavin, also the mineral iron, at first to white bread, but then to all processed carbs. It made its way into pasta, into flour, into cornmeal, into rice. And it had just as a magnificent effect. Pellagra just disappeared almost overnight. It was such an amazing example of if you marry nutritional science with public policy, amazing things can be achieved. We eradicated the disease that caused incredible suffering and killed thousands of people.

SHAWN STEVENSON: Wow, wow. And I don't want everybody to miss this point, was that folks were eating. And we actually, in the United States, it was the pellagra belt.

MARK SCHATZKER: Yes.

SHAWN STEVENSON: And so, we're talking about the southern countries, and folks were obviously eating, they were eating regularly eating food. But the food that they were eating was lacking in these key nutrients, needed to not just sustain health but to prevent rampant issues like this.

MARK SCHATZKER: Yes.

SHAWN STEVENSON: Got it, got it. And so, moving forward into this... So, this... We're building on a case here.

MARK SCHATZKER: Yes.

SHAWN STEVENSON: The next portion of this that you highlight in the book, is bringing forward this very powerful concept that's really well highlighted in the television show, The Biggest Loser, for example. When folks are brought forward, they're doing the conventional

protocol, exercising their face-off, dieting, they're doing the normal metrics, and they lose tremendous amounts of weight. But something really interesting or also can be framed as heartbreaking, happens after the show that most folks don't see. Let's talk about that.

MARK SCHATZKER: Yeah. Well, in the case of The Biggest Loser, there was just a lot of weight gain, which is what the scientists would predict. It's very hard to sustain weight loss, which is one of the challenges in diets, is that they seem to work in the beginning. Usually, a diet works for about six to eight months, and then it stops working. And because of that, people blame themselves. They say the diet was working, I failed. But what's really happening is they're running into their brain. The brain regulates body weight and that this is what nobody really wants to talk about 'cause it's kind of devastating to the diet industry, because they all want you to believe that you can... You have it within your power to make a simple decision. And it really isn't like that. You're going up against something very powerful, which is your brain, your brain's control over your body's physiology.

SHAWN STEVENSON: Yes, yes. And so, these are highly evolved... We tend to think possibly that we're broken, or things aren't working correctly, but your brain is doing largely what it's designed to do. And we've got the hypothalamus integrating our kind of temperature and also our nutrient thermometer in many ways, and so many other facets of our health, regulating the release of human growth hormone, all this different stuff. But what tends to happen is, we... Again, we maybe make a rapid jump in our weight loss or even an attempt in weight gain, but this thermometer tends to bring us back to this set point.

MARK SCHATZKER: Exactly. And this is an important point 'cause everybody thinks they're kind of... They emerge from the womb on a lifelong mission to get fat. And they say... It's like the stomach is this un-fillable pit. But that's not true. When we start to lose weight, the brain says, I want you to gain the weight back. But then scientists do overfeeding studies where they force people to eat food, and it becomes awful.

They had to do the early studies in prisons because it's just so unpleasant to be forced to eat more food than you need. It's difficult to get people to gain weight. And then when the studies are over, they lose the weight, so people bounce back to the set point. And the setpoint wasn't

always as high as it is now. So that's what this book... I was really fueled by this question of, what changed? And that's what got me on track with looking at Italy and the Southern US and pellagra. Because if we come back to that for a second, what is so interesting about the South is it really didn't work out well in the end. If you look at the...

It was called the pellagra belt, it is now called the obesity belt, or it's called the diabetes belt because the South graduated from one nutritional disaster to another. And you get the sense from looking at nutrition in the South that you're screwed no matter what you do. You're either going to starve or you're going to eat yourself to death, but there's no happy medium.

But maybe there is. Because let's go and look at Italy. Like we said, they eat a fantastic diet, a rich diet, a wonderful, amazing, unimaginably good diet in Northern Italy, and the rate of obesity is so low. So, what did they do differently? And this is where things get really interesting because they didn't... They could have said, "Let's just put vitamins in the polenta, in the pasta," and they didn't do that. And you look at it and you think like, "Why not? That just seems so obvious." And what they did do seems kind of medieval. They said, "Poor people should raise rabbits."

They set up communal bread ovens. One of the things they said is that people should drink wine, which you're like, "Wine. Are you nuts? These people are dying of a nutritional deficiency and you're saying drink wine?" But there was actually kind of maybe an accidental wisdom to that because the wines back then were not as well-filtered as they are now. They had a lot of yeast in them. And yeast actually has a ton of Niacin in it. So, telling someone with pellagra to have some Vino is actually good advice.

And here's what's interesting about Italy, they ate their way out of a nutritional deficiency. It took longer, but it worked. But what's so interesting is, you look at where they are hundred years later, and they have such a positive relationship with food. So, let's go back and say, "What's the difference?" Like you just said, our brain's smart. We have this hypothalamus, that there's this idea of a set point, that the brain knows how much it wants you to weigh and that it isn't inclined to weigh that much. What changed?

Well, let's look at how these two cultures looked at food. We looked at food, and we said there's something wrong with food. Sometimes it doesn't have the vitamins we need, and there's something wrong with us, 'cause we don't know what we need to eat because people will eat food that doesn't have the right diet. The Italians said, "No, no, no. Food isn't the problem. Food is the cure."

To the Italians, it was obvious that pellagra was caused by poverty. People couldn't afford to eat good food. All they could afford to eat was cornmeal and pork fat. Well, of course, they got sick. So, we saw food as a problem, and we saw ourselves as the scientific saviors who could step in and fix it. Italians saw food as the cure, and they saw food as having essential and worthy qualities. That the experience of eating food should be embraced, and that we should not be afraid of food.

And it seems odd because their approach is not nearly as technical, it's not steeped in science, but I believe it's the correct approach. 'Cause all we need to do is look at Northern Italy and say, they have the relationship with food that we want.

SHAWN STEVENSON: Absolutely. This is something... You know, we haven't talked often. And I love when I get a chance to talk with you. One of the things that I've been working to impress upon culture, I've been in this field for almost 20 years now, is just this... It's like a switch gets flipped in your mind to understand just how powerful food really is. It's literally making the tissues that you see right here through this camera, and I'm seeing on your screen as well, it's literally making our brain cells. It's making our immune cells. These are the foundational pieces that make us people. And so, it has a remarkable impact that is just often overlooked, because we just see it as just stuff.

MARK SCHATZKER: Yes.

SHAWN STEVENSON: In our culture today, we've lost this resonance and a connection with food, and it's more just a pleasure game. And you talk about this... One of your chapters, The Quest for Pleasure. So, let's talk about some of the information in that chapter.

MARK SCHATZKER: So, this starts with a French scientist named Michel Cabanac. And he was interested... This started with investigations into temperature and why things felt hot or cold. So, this is in the early 1960s. And back then, if you looked in a textbook and you said, "Why does water feel hot or cold?" It would say, "Well, it all has to do with your skin temperature." And if the waters like way above your skin temperature or a little ways above, it'll feel hot. If it's a bit kind of below, it'll feel cold. That was how it worked. It seems to make sense, right?

So, he did an experiment on himself where he... You know, he was doing something, and he made himself get really hot. And he had another subject showing up to the lab. And he had to get the bathtub cleaned up since he was going to do an experiment on this guy. And he's like, hot, and he's sweaty, he's scrubbing down the bathtub, and then he's got to rinse it. And he turns on the cold-water tap. And this bracingly cold water just pours over his hand. And he thinks to himself like, "Oh, it just feels incredible." And he has this sense, and he's goes like, "Hold on a second. That's not supposed to feel incredible, 'cause this water is really cold, and really cold water is supposed to feel unpleasant." And yet it felt pleasant. So, what's going on? So, he starts to do this experiment. The guy comes in and he puts him in this hot bathtub and the guy gets really hot.

He measures his internal temperature, and his internal temperature gets higher than it's supposed to be. And then he gives this guy a bucket of cold water and just says... Like ice water. He says, "Stick your hand in this ice water." And the guy says, "Oh God, it feels wonderful." That's not how it's supposed to work, right? So, then he dumps all this ice water into the bath and... Slowly the guy's temperature falls, he starts to get hypothermic, he's cold, he's frigid. Then he gives him a bucket of hot water and he says, "Stick your hand in that." And the guy says, "Oh my God, the hot water feels amazing." So here we see this thing, in just, like a matter of an hour, cold water feels great, then it feels terrible. Hot water feels terrible, then it feels great. What's going on? It all has to do with the internal milieu, what's going on inside your body. When you feel hot, coldness feels good. When you feel cold, warmth feels good.

Now, this is important because we can be very suspicious of pleasure. We're all Puritans. And we think we're smarter than that. We have to break the shackles of pleasure, but when it comes to temperature, what you want and what feels good is in line with what your body needs. Your

brain is trying to help you. It says, open the window and cool off 'cause you're overheating. It says, drink some hot chocolate when it's January here in Toronto because it's cold. And what's interesting too, is that this is a kind of instantaneous calculation. This is not the rational brain going, "I feel cold, therefore I should wear a sweater. These are just urges. This bubbles up from deep inside us. So, then he had this question. He's like, "Well if it works that way with temperature, shouldn't it work that way with food?" And it did work that way for him. He'd grown up all his life, he ate the delicacies of France, rich... You know, the French love all that good stuff: Cheese, and wine, and all that. And he kind of weighed like... He was not a tall guy, weight about 150 pounds.

But clearly, there was people where it just didn't seem to be in-sync, where they seem to consume more food than was physiologically necessary. And that really is the perplexing question of obesity. Why do we eat more than is necessary? We don't drink too much water. We don't put on sweaters on a hot summer day and then get heat-struck and go like, "Gee, I wanted to put on the sweater. What's wrong with my body?" So often, these natural systems seem to work. So, the book at that point really became a quest to understand what it is that could turn this brilliant brain to become so disordered that it would start to consume way more food than it needs, like way more food than it actually needs.

SHAWN STEVENSON: Yeah, this is powerful. And just even setting it up to look at that piece, what is the driving force there? And you begin to deconstruct this bliss point...

MARK SCHATZKER: Yes.

SHAWN STEVENSON: As well. So, what does that mean? What is this "bliss point?" And how can we actually measure what that is? There are some studies looking at drinking sweet water, for example, you mentioned.

MARK SCHATZKER: Well, yeah. So, it's interesting, the "bliss point" that term has become popular, because... Because I think, because of our suspicion of pleasure, because we're so afraid of it. And we talk about the way food has been engineered to be too delicious. And I'm somewhat suspicious of that. And it's really interesting if you look at the science of pleasure

because I think it's something we've gotten wrong and continue to get wrong. So, if you look around 50 years ago, psychology was dominated... There was two schools of thought, there was the Freudian, Sigmund Freud, the whole Oedipus complex, and all that. But then there are the behaviorists. And they were strict scientists. And they said, "Scientists can only measure what is measurable." So, they didn't believe in pleasure. They thought it was like the Easter Bunny. It's just sort of a myth. People were confused. They didn't know what they were talking about. They wanted to measure things. So, you could measure something like thirst. You could make a rodent... You could deprive it of water, and you can measure all the things a rodent would do. It might climb a whole bunch of blocks. It might endure electrical shocks to get what it needed.

So, they started to think of what we call pleasure as drive reduction, which is to say we get these urges, these unpleasant urges to drink water, to eat food, to cool off because we're trying to make a painful urge go away. Why do we eat? To make the pain of hunger go away. Why do we have sex? To make the... Kind of this urge that has this grip on us go away. And it's kind of a really dismal view of life when you think about it, 'cause there's nothing good in life, just various shades of bad.

Well, eventually, one day, at McGill University here in Canada where I live, somebody stuck a probe, like a sharpened wire inside the brain of a rat and started sending zaps and found that the rat enjoyed it. And what this suggested is in fact that pleasure does exist. So, our conception of pleasure really started to change. And we thought it all had to do with a neurotransmitter called dopamine, which everybody's heard of. You hear about it a lot. It's involved with drugs. Addictive drugs, especially, tend to be involved with dopamine. And for the longest time, we thought dopamine equaled pleasure. That it was like, literally chemical pleasure that you just sprinkle out in the brain and happiness ensues.

And what we found; this goes back a couple of decades now, really exploded our conception of pleasure. There was a scientist and Kent Berridge. And he really believed the dopamine equaled pleasure. And he was trying to do more experiments. This is what scientists do to support the hypothesis. And what he did is he gave some rats a drug that would kind of suppress dopamine. And then he just fired a little blast to sugar water in their mouths, rats love sugar water. And

he said, he hypothesized, "Well, with dopamine knocked out, they're just not going to enjoy the sugar water." So, he knocks out the dopamine, fires the sugar water in their mouths, and they make these cute little rat gestures. They lick their paws; they stick their tongue out. And that's the rat saying, "Ooh. That was delicious."

And he's like, "What the heck is going on? I got rid of dopamine, and they still enjoyed it. What is going on here?" So, he actually... Next step... He does a lesion in the rat's brain. He just gets rid... Kills the dopamine cells in the brain. So, there's no dopamine. And these rats are, like, catatonic, they're like zombies, their life has been absolutely drained of pleasure. There's no question in his mind, when he fires that sugar water in their mouth, there's just going to be like, Blaa. Right? No dopamine, no pleasure. Fires in the sugar water, they love it. They lick their paws; they stick their tongue out. He's like, "What the heck is going on?" So, he says, okay, I'm going to switch tactics, he sticks wires in their brains and cranks up the dopamine. Now he lets them eat, and oh my God, they are just gorging themselves. So, this starts to make it look like dopamine is pleasure, right? Not so fast. Because while they're gorging themselves, they're making these gestures, is to say, like, "This is gross. I can't stand this food, and I can't stop eating it." And we started to get data from humans that said the same things.

Parkinson's disease is caused by a lack of dopamine production because dopamine is also involved in movement, so they would give people with Parkinson's disease drugs that cranked up dopamine, and they would do strange things, they would go and visit prostitutes, they would binge-watch pornography, they would pester their wives for sex. They would get into scratch cards, they might dismantle their refrigerator and yet they would report that they didn't enjoy doing any of these things, it's like, something compelled them to do it. So eventually, Kent Berridge cracked the puzzle, what was going on, and he realized that what we call pleasure is in fact two different things, there's two different brain networks involved.

One is in fact run on dopamine, and this is what we call motivation or desire, or at its purest, craving. This is how we get stuff. When you're thirsty after you go for a run on a summer's day and you crave that glass of water, that is dopamine. That's your body saying, "This is what I want." But then when that water hits your mouth and you swallow it, and it's just refreshing and delicious, that's a different neural network, that runs on different neurotransmitters, the

opioids, and that is what Kent Berridge calls liking, that is the pleasure impact moment. And this is important because so often we think that overeating and obesity is characterized by indulgence. We are so afraid of pleasure, it's a stigma. We say they lose themselves in the pleasure of food, that they just don't have the good sense to say, "I've had enough." And when we look at the brain science, that's not what we see. Obesity is not about too much pleasure. If anything, they experience a blunted pleasure response. Obesity is a disease of craving, that's where the difference is.

It's not when they taste the pizza, it's when they see a picture of it or they get the aroma of it, they have this spike of dopamine craving, and it's actually a miserable condition because they are doomed to crave food and that food never delivers the pleasure that their brain expects. So that is a radical new understanding of how our brains are just not responding properly to food.

SHAWN STEVENSON: This is mind-blowing stuff right here, you know? And it's starting to articulate an underlying solution when, again, there's so much infighting about these minor details with macronutrients, for example. We're talking about a far more sort of primitive idea of things here that is just simply not getting fleshed out, and I want to ask you about this. In the same context, you mentioned a study with Indian students and laborers, and it involved not sweet water, necessarily, not the sweet water...

MARK SCHATZKER: Oh, sour water. Yes, yes, yes.

SHAWN STEVENSON: But sour water.

MARK SCHATZKER: Okay.

SHAWN STEVENSON: Let's talk about that.

MARK SCHATZKER: Yeah, so let's get back to this idea, 'cause this is really important, this idea that we're so afraid of our urges and pleasures. And we see that in people with obesity, that their urges are out of sync with what they need, but this is in fact a new thing, and this is part

of what's gone wrong because our urges are not supposed to work that way, and when we look historically, our urges are in line with our needs. I mentioned temperature, well, that's how it works with food too. If we look for example... Remember in history class, you'd read about those British sailors, and they would get scurvy, and they always tell you that in the history books, that their gums would swell.

Well, that really did happen, their gums did swell, all sorts of weird things happened, like, old wounds would open up. But what they don't tell you about was, the first symptom of scurvy, and that was a craving for fruits and vegetables. Well, scurvy is caused by deficiency of vitamin C. What do fruits and vegetables have? They have vitamin C. So, we see here that the urges are in line with what people need. But there's an even more interesting example, I found, which has to do with... It's a study that was done in Southern India. A scientist by the name of Howard Moskowitz, which people may have heard of Malcolm Gladwell wrote about Howard Moskowitz, he's the guy who realized people like chunky tomato sauce.

And Malcolm Gladwell has this great essay in his book about how there was no chunky tomato sauce in the market, Howard Moskowitz did this study and realized there's chunky tomato people out there, and Prego brought up chunky tomato sauce and made \$11 billion or something crazy like that. Well, Howard will tell you the most interesting study he ever did took place in India in the late '70s, and it's because he heard there's these people who really liked sour food. And that's not supposed to make sense, because back then, kind of like the rules about temperature, the scientists said, "Well, here's how it works. We like sweets. We don't like sour." So, he did a bunch of experiments. He did them on Indian medical students, but also these illiterate laborers, very poor people who were... They couldn't read or write, but they had this reputation for liking sour food.

So, when he looked at the Indian medical students who came from wealthy families, their taste looked a lot like the North American taste, which is to say, they liked sugar, the more sugar, it kind of reached this bliss point, and then it just became too sweet. But sour wasn't like that, they could tolerate a little bit of sour but then sour just became awful, "I don't want any sour, no sour, get it away from me." Then he did the same experiment on the illiterate laborers, and this was stunningly interesting, because they liked sweet, just the way everybody else does,

but they also liked sour. "A little bit of sour is okay. A little more sour? Well, that's better. A little more sour? Well, that's even better." Until sour reached this bliss point and their liking curve for sour looked just like their liking curve for sweet. So that's where the experiment ended, but I scratched my head and said, "Well, that's weird. Why would that be?"

So, I started to look into the history of this amazing place, Karnataka, it's in Southern India, and it turns out they would have a pellagra problem too, they ate... They eat roti, which we've all heard of. It's this kind of a flatbread and they would make it from a relative of corn called jowar, and like corn, like the grits and the polenta that gave Southern Americans and Indians pellagra... Oh, sorry, Italians. This jowar, if that's all you eat, you can get pellagra, it doesn't have niacin. So, pellagra would sweep in, to this plateau where they lived. Well, it's interesting, because one of those sour fruits that they really love to eat is called tamarind. It's this kind of fruit that grows on trees, and it's super, super, super, super sour. Like, you can get sweet tamarind in Thailand, and many people here have probably tasted it, but the Tamarind that grows India is very sour.

And the sourest tamarind is the cheapest of all, which is what these poor people would have been buying, these people who have very little money. When you start to look at tamarind, something really interesting pops out. It's loaded with Niacin. There is a ton of Niacin in tamarind. So here you see these people who have this diet that is, by its very nature, deficient in Niacin, and here they have this love for this ultra-mouth puckering fruit, which is a loaded with Niacin. Then it starts to get even more interesting because it turns out that Pellagra is just like the least of their problems. Their big problem when it comes to nutrition is fluoride. We think of Fluoride is that element in toothpaste that makes your teeth hard, right? It resists tooth decay in it, it does do that. It has this mineral interaction. But if you consume too much fluoride, you get something called Fluorosis. You can have these pitted dark stains on your teeth, but it can get really bad, people have malformed joints and a limb, they can get something called Bamboo Spine.

When you look at the photos, it's absolutely hideous. And here's something really interesting. I started to delve into the literature, the scientific literature in India. And it turns out that Tamarind can actually be used to treat fluorosis. They would do experiments, and they would

give dogs... They would add fluoride to dog's food, and they would give half the dogs tamarind and half of them, they wouldn't. And they would find that the dogs that were given the tamarind would excrete fluoride in their urine. They did the same thing in a hostel where orphans would live, and they found the same thing. They went into villages, and they found that the families that ate the most tamarind had the least fluorosis effects. So here you see, our urge is working, you see this nutritional wisdom, you see that our diet is not only intelligent, it's adaptable. So, this makes this mystery so much more interesting. Our brains know what is good. What is it that could be coaxing this incredibly intelligent brain into wanting too much food? When you see it this way, it becomes an absolutely like, stupefying mystery.

SHAWN STEVENSON: Yes. And this leads right into the nutritive mismatch...

MARK SCHATZKER: Yes.

SHAWN STEVENSON: That you talk about in the book and leading off with some research from Dana Small.

MARK SCHATZKER: That's right. 'Cause here's the interesting thing. Something changed. We're not wired this way. Something changed like in the last 50 years to make our brains go, "I want to eat more food. I want to eat way more food." Well, carbs haven't changed. Carbs have been carbs for eons. Same with fat. Fat is the same as it was 10 years ago, as it was 20 years ago, 30 years old. We might eat more of it, but the nature of fat has not changed. So, what has changed? Well, I argue it's the way food tastes. That is the big change. And I want to talk about that experiment you mentioned at Yale, this was done by a scientist named Dana Small. And she was asking what she thought was a fairly simple question, an important question, which is to say, "Is it possible to engineer drinks that deliver the same reward? They taste just as good, but with fewer calories?" It's an important question because if there's some way to provide ourselves with deliciousness, which is dangerous, but reduce the calories, that's a win, right?

So, she created... The question is, how do you do that in humans? How do you test this? And she came up with something really ingenious. She created five drinks and they all tasted like

they were exactly the same level of sweetness. She used an artificial sweetener called Sucralose to make sure all these drinks were exactly as sweet, each of them precisely, equal sweetness. But then she gave them a different amount of energy by adding a tasteless carbohydrate called Maltodextrin, which turns into sugar as soon as it hits your stomach. One of the drinks had no calories, one of the drinks had, I think it was 35. One had about 75, one had 120, one had 148. So here are five drinks, all taste like they have 75 calories worth of sugar, but all have a different nutritional payload. She gives these to her subjects, they drink them for a period of time, their brain learns, becomes accustomed to these drinks, and then she puts them on the brain scanner. And this is what Dana Small predicts, she predicts that the drink with the most calories is going to generate the biggest brain response, 'cause we like calories, right?

I mean, calories are important, you can't live without them, and the brain is going to learn what's in those drinks. Well, she does this study, she puts them in the brain scanner, and it's really weird. The 148-calorie drink just doesn't get much of a response, neither does the zero-calorie drink, neither does the 37 Calorie drink. The drink that gets the big response is the 75-calorie drink. She's like, "That makes no sense. Why would it be the middle drink, not the most..." She was so confused by it, she did it again and the same thing happened. Then she put subjects in what's called an indirect calorimeter. And this is a device that measures the thermic effect of food, which is to say when you can sync calories, you start to burn them, and when you do that, you generate heat, kind of like your car generates heat when you're putting gas through the engine. And she did the same thing, she had a... A subject came in one day, drank the 75-calorie drink, went into the indirect calorimeter and it was this nice little level of heat, exactly what you'd expect.

A few days later, that subject comes in, drinks the 148-calorie drink, goes into the indirect calorimeter, nothing happens. This is like, "What's going on? Textbooks say, more calories, more heat, there's no heat." It was just like a flat line. Dana Small can't figure out what's going on, and then it hits her. The number 75. The drink that got the biggest metabolic response, that generated a metabolic response, that generated the brain response, was the drink where the calories were in line with the sweetness. It tasted like it had 75 calories, and it had 75 calories. The other drinks tasted like they had 75 calories, they either had too much or not

enough, and it turns out that's a big deal. So we all carry on as though sweetness is like frivolous and bad, it makes us over-consume calories, and it turns out no, no, no, sweetness is information, it's telling your brain something very important about the calories that are heading its way, and when that signal becomes out of alignment when it thinks it's getting something and get something else, it's like the brain throws up his hands and goes, "I don't know what's going on." And those calories don't get metabolized properly.

And she did more experiments. So, she found that the more people are subject to this, it brings on a condition like metabolic disease. She did experiments with adolescents. And this is important because adolescents are in a period of growth. We know they like to drink sugary drinks in part 'cause their brains and their bodies are growing. And she gave them these drinks, and they had to stop the experiment because early on, they drew blood from three subjects, and two of them were already pre-diabetic. And a board of ethicists said, "You got to stop this, it'll be unethical to continue." So here we see something really important, that when you muck around with the taste of food, you are mucking around with an essential aspect of food. And we have to understand why that is because taste isn't frivolous, taste isn't just kind of like this meaningless silliness that lights up our brain while our body does the important business of nutrition, they are absolutely inseparable.

If you look at your DNA, and you think of that like, that's the book to make you, that's your instruction manual, what's the thickest chapter? It's not in your eyeballs, it's not in your reproductive parts, it's not in your brain, it's on your nose and mouth, and this is how we sense food. So, the information that we sense when we eat, we might think of it as like flavors and deliciousness, and it is all that, but it's also information. And when you start to muck around with that information, you start to change the way the brain understands food. And think about this for a second, because sweetness... You know, it was hard, in our evolutionary past when we were living in the trees and so forth, might have been hard to get that sweet fruit. There might have been a panther that wanted to pounce on you, you might have had to get into a fistfight with a competitor to get that fruit. But when you got that fruit, it did not tell a lie. If that fruit was sweet, it had calories, the sweeter fruit had more calories.

Now let's think of what we've done to food. We've created things like artificial sweeteners, we put sugar alcohols in food, which create the sensation of sweetness with fewer calories. Well, if you kind of run on this kind of old model that we had where our brain's this sort of Stone Age moron, yeah, fool that moron, let him think he's getting calories when he's not getting calories. But what if your brain's really smart, and what if it measures the calories coming in and then measures the calories that it metabolizes? Your brain keys on to the fact that "Hey, buddy, I'm on to you." Well, it isn't just sweetness that has changed, we...we put modified starches in food. I wrote a whole book about all the fake flavors we put in food that are designed to fool the brain. There's a huge family of additives called fat replacers. No one has any idea that these are in foods like ice cream, they're in yogurt, they're in plant-based milk products, they're in gravies, they're in energy drinks.

These create the rich sensation of fattiness in the mouth, and they deliver very few calories. Well, once again if your brain is a Stone Age moron, what a great idea. But what if your brain's really, really smart, and it's meticulous, and it's always measuring, and it's always calculating? That's not such a good idea. So then that brought me to what was the biggest question of the book, which was how... What is the long-term brain response? How does the brain respond when something that used to be reliable became unreliable? This is what scientists call uncertainty, or they call it, "Reward Prediction Error," which is to say your brain thinks something, it's predicting a reward, that reward doesn't arrive, what does that do to a brain? We see a spike in dopamine, we see a spike in motivation, in wanting, in craving. We see activity in that part of the brain that we see is elevated in people with obesity. So now the pieces of the puzzle are starting to fit together.

SHAWN STEVENSON: Yes, they are. Yes, they are. So just as a summation on an important point, this is one of the biggest takeaways, not just of this show, but truly in people's lives, is that, as we evolved, the taste of a calorie matched the energy it delivered. With real food as we evolved, there was a match that was taking place. Your brain, this hyper-intelligent tasting mechanism that we have, our tongue, our ability to smell, all those things, you just said it, it does not tell a lie, it's matched up. And then once we started to manipulate those pathways, in your last book, you talked about this post-ingestive feedback.

MARK SCHATZKER: Yes.

SHAWN STEVENSON: And you consuming a certain food, and your body basically taking notes on what it got from this particular food, and that intelligence is still there, you know? An animal in nature knows it's experiencing a deficiency in, fill in the blank, maybe it's vitamin C. We know that over here they got these little berries hanging off this bush over here, and the animal will be driven to go and find those calories and those nutrients, because of that connection between food, flavors indicating the nutrition there, and also now you bring it forward in your book, the flavors indicating the caloric density...

MARK SCHATZKER: Correct.

SHAWN STEVENSON: Of the food itself. And now we pivot into, you just highlighted this, started to talk about it, this concept of loss-chasing, like in gambling.

MARK SCHATZKER: Yes.

SHAWN STEVENSON: And how this applies to nutrition for humans.

MARK SCHATZKER: Yeah, exactly. So, we crossed all these wires, and... Yeah. And so, what's the effect of that? Well, I think one of the best places to look, actually, is in gambling, 'cause gambling is a lot like obesity. From a distance, you see someone, a problem gambler, and you think, "What are you doing?" like, "Stop doing what you're doing. It seems crazy." And it's similar with obesity, we see, "Why would somebody eat more than is necessary?" But they're similar in the sense that both are kind of misguided attempts to gain. Obesity is an attempt to gain calories, successful. Gambling is an attempt to gain money, unsuccessful. Well, it's really interesting when you look at the psychology of uncertainty, and also the economics of it because it brings it to light. Let's look first at the psychology. This gets into Ivan Pavlov, all that stuff with, you ring the dinner bell, you give dinner to the dog, and the dog goes, "Ah! The bell equals dinner," starts to salivate when it hears that bell. Well, scientists always thought that the more reliable that bell was, the stronger of a cue that it was. So, then they start to do experiments where they start to make the bell intermittent.

The bell sometimes means dinner is coming, sometimes it doesn't. And you think, "Well, what's that going to do? It means a dog is just going to learn to ignore the bell 'cause it's not reliable." Wrong, the dog becomes obsessed with the bell, the bell becomes more interesting. Why? Because when things are uncertain in nature, you have to work harder to acquire them because otherwise, you might suffer a loss. And this is what takes us to behavioral economics. It takes us to the work of Amos Tversky and Daniel Kahneman in the '70s, who asked what they thought was a simple question, which is, why do people gamble? And people always thought it's 'cause you want to get money.

You go to Vegas to get money, you take a bet with your friend to get money, doesn't make sense though because people will play poker for pennies. I might bet in a basketball game with you 10 bucks. It'll be a fun bet. I hope I win; you hope I lose. Is 10 bucks going to make you wealthier or make me wealthier? Not really. In fact, I don't think either of us could calculate what percentage of our wealth that is, it would take us days of accounting but if I say, "Hey, 10 bucks on the basketball game tonight?" "Yeah, I'm in." What is it about gambling that excites us? It's the uncertainty. Humans are drawn to uncertainty because being drawn to uncertainty is how we gain control of our environment.

So, this is what we've done with food, is we've made these cues uncertain, and it's ramped up our motivation. If you're struggling to understand it, just think of this. If I told you that the gas gauge in your car was uncertain, might be full, might be empty, what would you do? You'd fill the car. You'd be like, "I don't want to run out of gas. It would be a disaster. I'll have to call a tow truck; I'd be late for my meeting." You would probably fill your car all the time. You just be like, "I'm just not sure what's there." The threat of a loss, the psychology tells us, is more unpleasant. A loss is more unpleasant than again is pleasant. Losing hurts more than winning feels good and this is what... This is why problem gamblers when they get in the hole, they're down 2000 bucks.

You look at them, you say "You're nuts, walk away from the slot machine, walk away from the blackjack table." What do they do? They double down. Why? Because the domain of losses is so unpleasant that they will do anything to get out of it. Well, we see a similar thing. We look at

all the foods in our food environment and you see like, you can go to these restaurants and get meals that have 1200 calories, that have 1800 calories. You can get these milkshake coffee drinks that have more than half your daily requirement for calories. And is it because we're naturally attracted to calories? No, it's because our brains have experienced this uncertainty and the one thing, they want is a certain source of calories. So, we prize these things, we consume them, we stuff ourselves with calories because we have goaded ourselves in this unnatural desire to consume calories.

SHAWN STEVENSON: I've said this many times that food tastes good so that we eat it. There's been this battle against taste as well as you've highlighted several times. And in the book, you actually target this question, why does food taste good, anyway? That's the name of the chapter and you tell the story of this nine-year-old boy named Tom. Please share that story.

MARK SCHATZKER: It's so interesting and this really highlights the importance of taste. Tom, this is over 100 years old, and it's hard to imagine, but when he was a young boy, he somehow consumed clam chowder that was so hot that it sealed his throat shut, he was unable to swallow food for the rest of his life. Well, doctors saved his life, they created what's called a fistula in his stomach, an opening where he could just load food in. The same way you just load a box into the trunk of your car, he would just load the food in. Now chewing food, putting food in his mouth was completely unnecessary. Now, he could do what we all want to do, is he got direct nutrition, just put it right in the stomach but he wasn't doing well.

After they did this operation, he was doing very poorly, they didn't know what to do, they're putting food in the stomach, but he just was failing to thrive. And then one day this little boy goes, "Let me taste it first." So, they gave him the food to taste, and he would taste the food, and then he would put it in his stomach, and he started to thrive. It changed... It saved his life. For the rest of his life, he would insist on chewing food first and then he'd spit it into this tube that went right into his stomach. He said if he didn't taste the food first, it went right through him, it's like he didn't eat, so many of us say that. You're at an airport, you eat some awful fast-food meal, and it's like, "Wow, I just ate 1200 calories and I'm still hungry, what's going on?" It tells us how important it is for us to sense the qualities that's in our food.

SHAWN STEVENSON: Very powerful, very powerful. Got a quick break coming up, we'll be right back. Researchers at Yale University School of Medicine, the researchers found that one of the biggest culprits behind our obesity epidemic is neuroinflammation. Brain inflammation increases the propensity of obesity and obesity increases the propensity, the likelihood of neuroinflammation, they go hand in hand. So, we've got to address this. One of the things that's been proven to help to reduce neuroinflammation is cited in a study published in PLOS One, the Public Library of Science One, revealed that the super green algae, spirulina, has the potential to one, improve neurogenesis in the brain, so the creation of new brain cells, specifically the hippocampus, is where we get a lot. And the hippocampus is the memory center of the brain, this is kind of important.

And two, the study revealed that spirulina is able to directly reduce neuroinflammation. It's incredible. It's helping the structural integrity of this master gland, this master organ controlling everything about us, all right? The most complicated object in the known universe is also one of the most fragile, we've got to protect it. This is why for myself and my family, spirulina, chlorella, ashwagandha, all of these powerful foods are put together in the incredible blend at Organifi and this is a regular staple here in my family for good reason. Spirulina, it being one of the highlighted ingredients, not only does it have its benefit for neurogenesis and neuroinflammation but also has rare nutrients like phycocyanin, the same thing with chlorella as well.

That phycocyanin is one of the few things that can trigger stem cell genesis, the creation of new stem cells, very few things have been found to do that, and then chlorella's in the formula as well, and that growth factor, the chlorella growth factor, is just remarkable. And also, its benefits in helping your body to metabolize and eliminate heavy metals, and the list goes on and on. It's incredible, but the bottom line is this, it tastes good. It tastes good. I've experimented for at least about 15 years with all these different green formulas, these different green superfood blends, many of them is not very good, okay? Many of them. They shall remain nameless, but I've tried them back in the day before tasting good was an option. Just like, just get it in, by any means necessary, if you've got to do the whole pinch the nose and getting it down, whatever. But now, pleasure leads to longevity. Pleasure leads to taking a practice on it and imbibing it and making a part of your routine, your habits, your daily life.

So, this is why I appreciate the fact they've created a formula that actually tastes good, all organic, cold process, so you actually retain and get the nutrients that we're looking for in Organifi. So, pop over there, check it out, it's organifi.com/model. That's O-R-G-A-N-I-F-I.com/model. And you get 20% off, 20% off their green juice formula, their red juice formula, and also their gold as well. So, they've got some incredible blends, all done the right way, with integrity, again, organic, low temperature-processed, and yummy. Alright. Organifi you got that yummy, yummy. [Organifi.com/model](http://organifi.com/model). And now back to the show.

Now, this might be one of the most remarkable parts of the book, again, we've already talked about so many remarkable aspects here, but you are eating pig feed. This information here is just mind-blowing. Let's talk about that.

MARK SCHATZKER: Well, I talked... Yes, nutritional mismatch is one of the pillars. But I started to ask the second question, which was, Let's go back and look at fortification, let's look at enrichment. 'Cause, it was a really successful policy, it was also kind of interesting, there was just this tiny, tiny, tiny subset of the American population that had Pellagra, but all of a sudden everybody starts to get niacin and thiamine and riboflavin in bread, in donuts, in cereal. Was there some unforeseen consequence? And I'll be the first to say on the surface, that sounds nuts, I'm talking about vitamins. Aren't vitamins like the healthiest most wonderful thing in the universe? They have the word vital in them. We talk about consuming empty calories 'cause they don't have vitamins. Vitamins are good for you.

Well, is it always that simple? 'Cause the interesting thing is when you look at that Southern diet, that those Southerners were literally starving on, it had lots of calories, they were eating grits, which is to say cornmeal, pork fat, and molasses, you got carbs, fat, and sugar. And they were starving. How's that possible? It's because calories on their own are empty. What they need is the B vitamins to metabolically enable them. So, you could eat 5000 calories a day, if you don't have the B vitamins, they will go right through you. There will be zero energy in them. That's why we talk about the wholeness of food. We're not machines, we don't just require energy, we required food in its dimensional wholeness. Well, that means that these vitamins play a role in calorie metabolism.

So now let's fast forward the clock to the 1950s, and let's talk about pig farming, because pig farming is a commodity business, you get paid by the pound, so it's in the farmer's interest to get those pigs in and out as fast as possible. And what does the farmer want to do, they want to get it big and fat quickly. Well, in early 1950s farmers knew, if you want to get your pigs big and fat quickly, what do you do? You feed them corn and soy, and that's like rocket fuel, they put on the pounds, but you can only feed them so much. If you feed them too much corn and soy, they get a pig version of pellagra. It is a nutritionally incomplete diet. So, farmers back then knew that you had to send your pigs up to pasture to eat things like alfalfa. These were the glory days of food; all the pork was pastured pork. Well, the discovery of B vitamins changed everything, because now you could give your pigs that rocket fuel feed, and instead of sending them out to pasture or bringing them cut alfalfa, you just sprinkle in this dusting of B vitamins and they can just eat that rocket fuel all day, and their growth curve took off. This changed farming forever.

We talk about confinement farming and CAFOs and keeping animals in close quarters and feeding them what we feed them. This would not have been possible without the discovery of vitamins. Vitamins meant pigs didn't need to eat all that green stuff that's good for them, they could just get the vitamins in their feed, and they got bigger and fatter, faster than ever before. Well, that's pigs, we're humans. And what's our problem? We get bigger and fatter, faster than ever before, and what did we do? We started adding B vitamins to our processed carbs. So, I asked the question. Maybe that wasn't a good idea.

SHAWN STEVENSON: Oh my gosh. This here, again, we're wondering why or how is this even possible? And we look at the nature of farming today, one of the interesting things, I've talked about this a couple of times, there was a big spill that took place on a US road, and all of these Skittles just came out across the highway. And the news who was reporting that these Skittles were on their way to be delivered to some cattle farmers, alright, this was going to be used for our cattle feed. And one of the videos that I actually attached to my show and we'll put that for everybody here as well, was demonstrating that these farmers were literally just giving this slop with candies, wrapper and all, and a mixture of all kinds of, it looks like strands or maybe a little bit of hay, but it's also enriched as well, so they're adding this enrichment to this feed,

and they're like, "Yeah, the cows love it. They're doing great." Of course, there's antibiotics in there as well.

MARK SCHATZKER: Yeah, and the vitamin pre-mix.

SHAWN STEVENSON: Yeah, and so they're just adding this in and you're wondering, "Why on Earth would the cows go for this?" That there's an intelligence there as well, and so it creates this kind of superficial draw to eat things that are not actually... Without them would not actually be satiating and draw us to them...

MARK SCHATZKER: Exactly.

SHAWN STEVENSON: And it was kind of creating this mismatch like you've been kind of scripting out.

MARK SCHATZKER: One of the most interesting things in these old studies I dug up, is they would look at... They started to do experiments, of course, to see which diet is best, and one of the most interesting ones, they had four groups of pigs, half of them were in confinement and half of them were on pasture. And then within those two groups, some had access to a mixed ration, which is to say those vitamins are blended in with the carbs and protein, and some had a free choice diet, which is to say they got the corn in one trough, and they got the vitamins over in another trough, and the most interesting thing was the pigs on pasture, that had the free choice diet, well, they ate corn, no surprise there, but they also gained the slowest of all the pigs but they didn't eat much of that vitamin supplement, they ate Alfalfa. The pigs that got their vitamins mixed in didn't. So, there's this idea that when we start to put these nutrients in food, it actually switches off that appetite that might make you say, "I want to go eat something... This thing over here," which might be a really healthy thing. So, when we murk around with these things, we think we're so smart but we're not. We don't understand the inner brilliance of how the brain really works, and we think we're doing good and we're actually causing harm.

SHAWN STEVENSON: This is such a powerful insight. There's so many powerful insights but just this one, you just mentioned this, I don't want to gloss over it. We would likely have a draw towards a certain food, a diversity of different foods, just naturally, we would have an inclination to go and, "Let me go and grab some of this, let me grab some of these apples over here. Let me grab some of these walnuts," whatever the case might be, but those signals, those things that kind of catapult us, in a sense, or urge us, nudge us, to going and investigating and trying those foods, tasting those things, those can get silenced in a sense through this enrichment process. And now when left to our own devices, like with these pigs, when we have the opportunity to experience a life, in its natural form, there might be a tendency towards doing that, and so this leads to my final question for you today, because listen, you've packed so much into this already, I want to make sure that folks get the book. Can we fix this is? Is the intelligence in our body still there? Can we fix this and actually get to a place of health and a healthy association, and a connection with our food again?

MARK SCHATZKER: Yeah, I think we can, and I think it's a complicated question. I think it takes a long time for us to do what... To got where we got, so it's not something you can fix overnight. I think it's really important. If you're going to try and eat healthily, you got to eat real food. I'm not the first to say that, but here's the thing, you got to eat like an Italian, which is to say, you've got to love food. Look at each meal as an opportunity to explore the richness and deliciousness and awesomeness of food. Food tastes delicious for a reason and the pleasure that it gives you is a good thing, don't be afraid of it. It's like any relationship, like a relationship with your spouse, it should give, it should be wonderful, it's something you should look forward to, not something you're frightened of, and something that leaves you in a state of anxiety. And there is science that tells us that the pleasure of food is important, and this is what I'll leave you with, is this experience I had in Germany at a lab, a fascinating women named Anja Hilbert, who deals with some of Germany's most troubling cases of disordered eating.

And she has a lot of patients that have binge eating disorder, and this is wanting and craving at its worse, these people will eat to the point where they're physically uncomfortable. Well, she understands eating through the language of pleasure, through wanting and liking, and she brought me... Brought me into this therapy that really brought to light how it feels, how these states feel, and what foods are associated with them. So, the first thing she did is she made

me experience craving, and she gave me two potato chips, and I like chips, we all do this thing with chips where you just start to eat them and eat them. So, I'll eat chips, I would never tell you that chips are my favorite food. I don't have any memory of eating a great bag of chips. I can tell you about great steaks I've had, great peaches, great peach cobbler, great bottles of wine, I can't name a single bag of chips I ever ate, but we eat chips. Well, she gave me two chips, and she said, "You can't eat them. You can nibble them, you can smell them, you can rub them together." And I thought it was silly, but very quickly, I was absolutely overcome by craving, I wanted to eat these chips so bad.

She said, "Throw those out and do it again," and it got even worse, it was like pain, this was a really unpleasant state. And it made me realize that some foods just have this grip over us, then she did something fascinating, she said, "Okay, get rid of the chips. Now, take a square of dark chocolate." She gave me the square of dark chocolate, surrounded with biscuit center, and she said, "just pop that in your mouth, and let the heat of your body melt it," and this was such a different food experience, this chocolate took me on a journey. I closed my eyes, and I was the passenger, and this tiny little chocolate just gave me so much pleasure, and I wasn't sitting there thinking, "I want to shove as much chocolate in my mouth as possible," I just let the chocolate do its thing. What's amazing is that Anja Hilbert uses this therapy with people who have binge eating disorders, when they are overcome with these volcanic desires to eat, eat, eat.

She says, "Just pop a very fine chocolate in your mouth." And these chocolates can deliver so much pleasure, it extinguishes the craving for food, so that tells us how important it is that food gives us pleasure. We did not evolve to be nutritionists, to get into arguments about ketosis and protein and insulin, we evolved to eat real food and to experience the pleasure of it. That is how our brain relates to the environment, that is how we eat what is good, and that is how food should be. It's how food is good for us, by providing us with pleasure, by nourishing our bodies.

SHAWN STEVENSON: Mark Schatzker, *The End of Craving: Recovering the Lost Wisdom of Eating Well*. Mark, can you let everybody know where they can pick up this amazing book?

MARK SCHATZKER: It's in bookstores, it's on Amazon, I hope they enjoy it as much as I enjoyed talking to you, Shawn.

SHAWN STEVENSON: Yes, truly a pleasure. And again, you are absolutely brilliant writer. It's a joy to read the book. And listen, I can't wait to see what you do next. The Dorito Effect was game-changing. This book here takes everything to another level, The End of Craving. Everybody makes sure to run right now and get yourself a copy. Mark, thank you so much for hanging out with us.

MARK SCHATZKER: Thank you. I had a great time. Thanks so much.

SHAWN STEVENSON: Thank you so much for tuning in to the show today. I hope you got a lot of value out of this. This is foundational information. This is foundational insights into human metabolism, human health, helping to crack the code to solve the issue of why we are in the state that we are in. As evolved as we might be, we could have fancy pants, Teslas and suicide doors, Lambos, we can have scientific calculators, alright, shot out to the Texas Instruments. Do you remember Texas Instruments? Something we were required to have, they're just like, you're going to need these calculators, and so, these big blocky calculators that could do all of this crazy stuff. We can be incredibly evolved on the surface with our technology. We have very, very long-lasting primal programming that is running the show with how we're designed.

We've taken gigantic leaps just in the past decades, as far as technology is concerned. So again, on the surface, it can look like we're living in the future, it can look like we're living in the times of Star Wars, alright? We're flying around here on cars and that kind of thing. Back to The Future, how Back to the Future was supposed to be the future that it was supposed to be before going back to the past and then going to the future. Alright, follow me. Okay, with the hoverboards. It can look like that on the surface, but we are wired to an association with our food, there is a deep intimate connection because our food becomes us, and understanding that the taste of a food, the taste of a calorie through our evolution, matched the calorie density that it delivered. The taste of that calorie matched the energy that it gave us. And as soon as we started to muddy up the waters here, this is when all H-E Double Hockey Sticks broke loose, alright?

Now, having these powerful insights, that food has an innate intelligence, the human body has an innate intelligence, if we don't start here, we're never going to get to where we need to be as a society. The way we've been doing things clearly has not worked, but there are individuals who are thriving throughout all of the madness that has taken place as far as our rampant, multi-epidemics of chronic disease, of heart disease, diabetes, obesity, cancer, autoimmune diseases, autism, the list goes on and on and on. The things that have continued to skyrocket despite our evolutions, despite our scientific calculators, we can calculate it. MIT, I'm still bitter about this, it was like \$100 for this freaking calculator that I used for a semester, alright? I'm clearly bitter. Alright? But we can see how we can be mistaken. On the surface, again, it looks like we know so much, but what I've been employing you to do since the very beginning of The Model Health Show is for you to have the audacity to look at the results.

Look at the world around you. How's it going? Have the audacity to look at the results. Look at what's happening in our communities, look at our own results, have the audacity to self-assess, and to be honest, is what I'm doing working? Regardless of whatever they are telling you should be doing, is it working for you? And is it working for you right now, and if that changes over time, can we have the audacity to say, "Hey, you know what? This isn't working for me anymore. Let me try something else." Alright, so to empower you with these tools, that's what we really strive to do. And again, we are just scratching the surface on what we are going to accomplish as a community, and I appreciate you so much for being a part of it. If you got a lot of value out of this episode, please make sure to share it out with your friends and family, send this directly from the podcast app that you're listening on, send it right to their phone with the little notes saying, "I love you."

And also, of course, you could tag me on Instagram and Twitter and Facebook, share this out, share this out with your followers on these platforms. You can tag me, I'm @shawnmodel on Instagram and on Twitter and @TheModelHealthShow on Facebook, alright? So, tag me, of course, and just let folks know what you thought about this episode, take a screenshot, I'd love to see that. And we've got some powerful masterclasses, and amazing guests coming your way very soon, so make sure to stay tuned. Take care. Have an amazing day, and I'll talk with you soon.

And for more after the show, make sure to head over to themodelhealthshow.com, that's where you can find all of the show notes, you could find transcriptions, videos for each episode. And if you got a comment, you can leave me a comment there as well. And please make sure to head over to iTunes and leave us a rating to let everybody know that the show is awesome, and I appreciate that so much and take care. I promise to keep giving you more powerful, empowering, great content to help you transform your life. Thanks for tuning in.